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AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claim 1 (previously presented) A method for assessing metabolic fitness or aerobic demand of a living system, comprising:

- a) administering an isotopically labeled precursor molecule to the living system for a period of time sufficient for a label of said isotopically labeled precursor molecule to be incorporated into a mitochondrial molecule in said living system;
- b) measuring an isotopic content, isotopic pattern, rate of change of isotopic content, or rate of change of isotopic pattern of said mitochondrial molecule; and
- c) calculating a rate of synthesis or degradation of said mitochondrial molecule to assess metabolic fitness or aerobic demand of said living system.

Claim 2 (original) The method of claim 1, wherein the isotopically labeled precursor molecule is labeled with a stable isotope.

Claim 3 (original) The method of claim 1, wherein the isotopically labeled precursor is selected from the group consisting of ^2H -labeled glucose, ^{13}C -labeled glucose, a ^2H -labeled amino acid, a ^{15}N -labeled amino acid, a ^{13}C -labeled amino acid, ^2H -labeled acetate, ^{13}C -labeled acetate, a ^2H -labeled ribonucleoside, a ^{13}C -labeled ribonucleoside, a ^{15}N -labeled ribonucleoside, a ^2H -labeled deoxyribonucleoside, a ^{13}C -labeled deoxyribonucleoside, a ^{15}N -labeled deoxyribonucleoside, a ^2H -labeled fatty acid, and a ^{13}C -labeled fatty acid.

Claim 4 (withdrawn) The method of claim 1, wherein the isotopically labeled precursor molecule is $^2\text{H}_2\text{O}$.

Claim 5 (withdrawn) The method of claim 1 wherein the isotopically labeled precursor molecule is ^{13}C -glycine.

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Claim 6 (withdrawn) The method of claim 1, wherein the label of said isotopically labeled precursor is a radioactive isotope.

Claim 7 (withdrawn) The method of claim 1, wherein the isotopically labeled precursor molecule is selected from the group consisting of ^3H -labeled glucose, ^{14}C -labeled glucose, a ^3H -labeled amino acid, a ^{14}C -labeled amino acid, ^3H -labeled acetate, ^{14}C -labeled acetate, a ^3H -labeled ribonucleoside, a ^{14}C -labeled ribonucleoside, a ^3H -labeled deoxyribonucleoside, a ^{14}C -labeled deoxyribonucleoside, a ^3H -labeled fatty acid, and a ^{14}C -labeled fatty acid.

Claim 8 (original) The method of claim 1, wherein the mitochondrial molecule is a deoxyribonucleic acid (DNA).

Claim 9 (withdrawn) The method of claim 1, wherein the mitochondrial molecule is a ribonucleic acid (RNA).

Claim 10 (withdrawn) The method of claim 9, wherein the RNA is selected from the group consisting of ribosomal RNA, transfer RNA, and messenger RNA.

Claim 11 (withdrawn) The method of claim 10, wherein the RNA is messenger RNA.

Claim 12 (withdrawn) The method of claim 1, wherein the mitochondrial molecule is a protein.

Claim 13 (withdrawn) The method of claim 12, wherein the protein is selected from the group consisting of a subunit of cytochrome c oxidase, a subunit of F_0 ATPase, a subunit of F_1 ATPase, a subunit of cytochrome c reductase, and a subunit of NADH-CoQ reductase.

Claim 14 (withdrawn) The method of claim 1, wherein the mitochondrial molecule is a lipid.

Claim 15 (withdrawn) The method of claim 14, wherein the lipid is a phospholipid.

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Claim 16 (withdrawn) The method of claim 15, wherein the phospholipid is selected from the group consisting of cardiolipin, phosphatidylcholine, phosphatidylethanolamine, and a mixture thereof.

Claim 17 (withdrawn) The method of claim 1, wherein the living system is a tissue.

Claim 18 (withdrawn) The method of claim 17, wherein the tissue is muscle.

Claim 19 (withdrawn) The method of claim 18, wherein the muscle is skeletal muscle or cardiac muscle.

Claim 20 (withdrawn) The method of claim 17, wherein the tissue is adipose tissue.

Claim 21 (previously presented) The method of claim 1, wherein said measuring is performed by mass spectrometry, NMR spectroscopy, or liquid scintillation counting.

Claim 22 (original) The method of claim 1 wherein the isotopically labeled precursor molecule is administered orally.

Claim 23 (original) The method of claim 1, wherein the living system is an animal.

Claim 24 (original) The method of claim 23, wherein the animal is a mammal.

Claim 25 (original) The method of claim 24, wherein the mammal is a rodent.

Claim 26 (original) The method of claim 24, wherein the mammal is a human.

Claim 27 (withdrawn) The method of claim 1, wherein the living system is a cell.

Claim 28 (withdrawn) The method of claim 27, wherein the cell is a platelet.

Claim 29 (withdrawn) The method of claim 27, wherein the cell is a cultured cell in a high-throughput screening assay system.

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Claim 30-58 (Canceled)

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